OM-2242 208 580H

January 2005

Processes

Stick (SMAW) Welding

TIG (GTAW) Welding

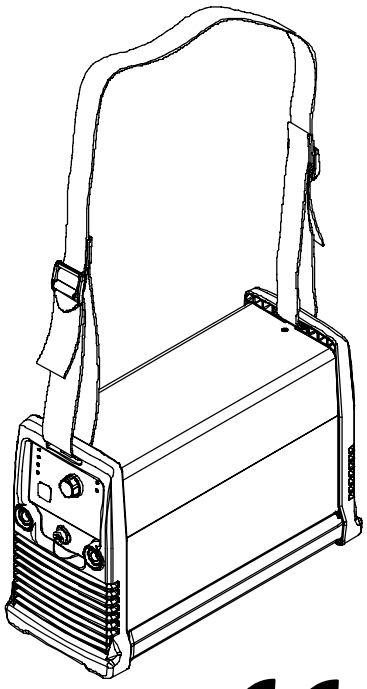
Description

CC DC 1 Phase

Arc Welding Power Source

Maxstar® 150 STH

With Auto-Line™



CE **And Non-CE Models**

OWNER'S MANUAL

Visit our website at

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ENGLISH

FRANÇAIS

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DEUTSCH

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WARRANTY

ENGLISH

Declaration of Conformity For European Community (CE) Products

NOTE ☞	*This information is provided for units with CE certification (see rating label on unit.)*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **Maxstar® 150 STH**

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC

Electromagnetic compatibility Directives: 89/336/EEC, 92/31/EEC

Machinery Directives: 98/37EEC, 91/368/EEC, 92/31/EEC, 133/04, 93/68/EEC

Standards

Arc Welding Equipment − Part 10: Electromagnetic Compatibility (EMC) Requirements. IEC 60974-10 August 2002

Arc Welding Equipment − Part 1: Welding Power Sources. IEC 60974-1 Ed. 2.1

Degrees of Protection Provided By Enclosures (IP Code): IEC 60529 Ed. 2.1

Insulation Coordination For Equipment Within Low-Voltage Systems: Part 1: Principles, Requirements And Tests. IEC 60664-1 Ed. 1.1

European Contact: Mr. Danilo Fedolfi, Managing Director
ITW WELDING PRODUCTS ITALY S.r.l.
Via Privata Iseo 6/E
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98290−203

SECTION 1 − SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground − check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first − double-check connections.
- Frequently inspect input power cord for damage or bare wiring − replace cord immediately if damaged − bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

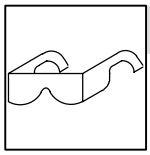
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

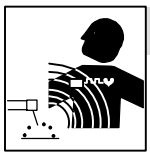
- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder − explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

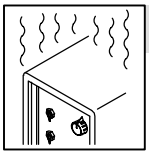
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring − be sure power supply system is properly sized, rated, and protected to handle this unit.

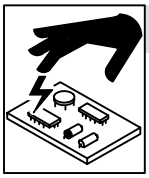
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

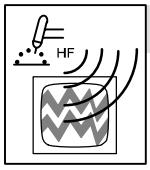
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

For Gasoline Engines:

▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

For Diesel Engines:

▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (phone: 305-443-9353, website: www.aws.org).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (phone: 305-443-9353, website: www.aws.org).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101(phone: 617−770−3000, website: www.nfpa.org and www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202−4102 (phone: 703−412−0900, website: www.cganet.com).

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800−463−6727 or in Toronto 416−747−4044, website: www.csa−international.org).

Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036−8002 (phone: 212−642−4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101 (phone: 617−770−3000,website: www.nfpa.org and www. sparky.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices−−phone for Region 5, Chicago, is 312−353−2220,website: www.osha.gov).

1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 − DEFINITIONS

2-1. Warning Label Definitions

A. Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

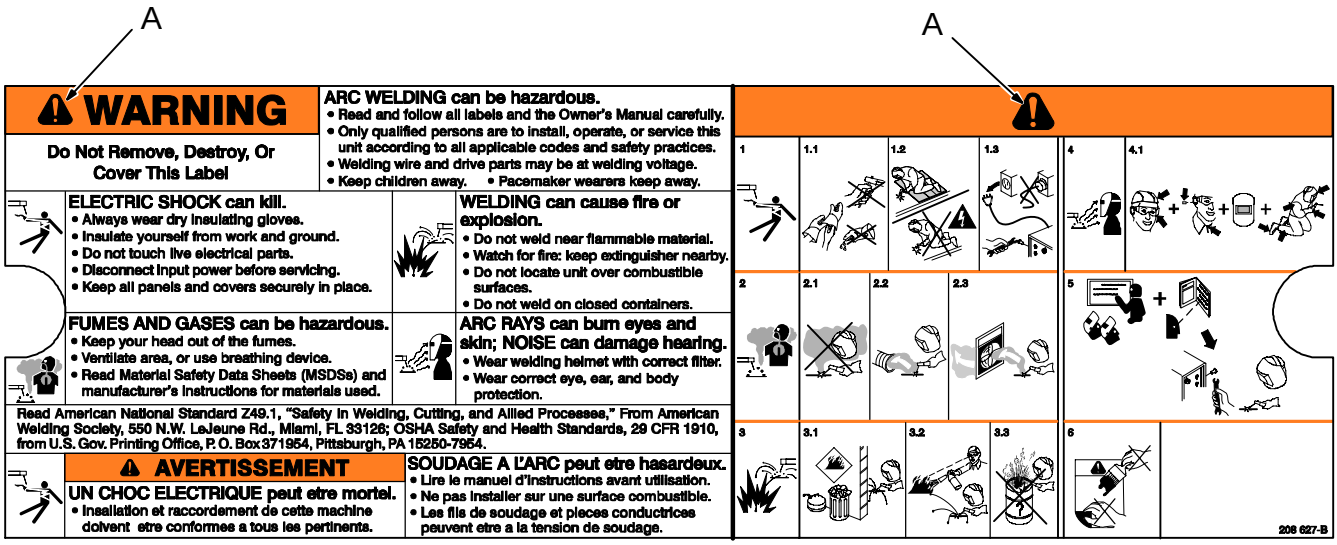
3.3 Do not weld on drums or any closed containers.

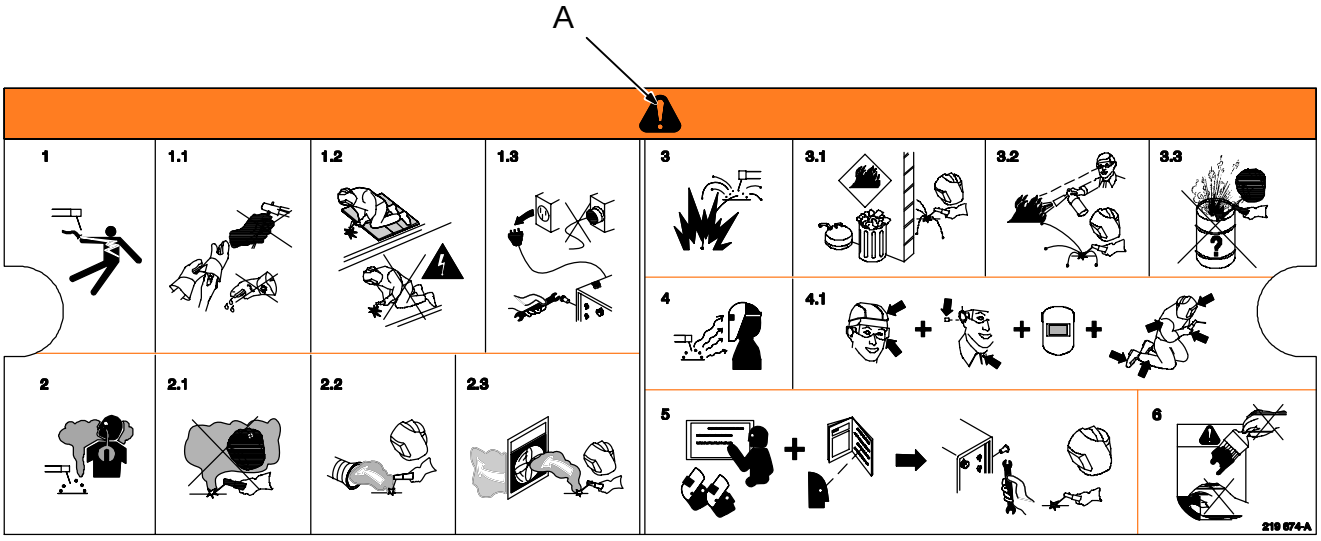
4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.


A
A
WARNING
Do Not Remove, Destroy, Or Cover This Label
ARC WELDING can be hazardous.
• Read and follow all labels and the Owner's Manual carefully.
• Only qualified persons are to install, operate, or service this unit according to all applicable codes and safety practices.
• Welding wire and drive parts may be at welding voltage.
• Keep children away. • Pacemaker wearers keep away.
ELECTRIC SHOCK can kill.
• Always wear dry insulating gloves.
• Insulate yourself from work and ground.
• Do not touch live electrical parts.
• Disconnect input power before servicing.
• Keep all panels and covers securely in place.
WELDING can cause fire or explosion.
• Do not weld near flammable material.
• Watch for fire; keep extinguisher nearby.
• Do not locate unit over combustible surfaces.
• Do not weld on closed containers.
FUMES AND GASES can be hazardous.
• Keep your head out of the fumes.
• Ventilate area, or use breathing device.
• Read Material Safety Data Sheets (MSDSs) and manufacturer's instructions for materials used.
ARC RAYS can burn eyes and skin; NOISE can damage hearing.
• Wear welding helmet with correct filter.
• Wear correct eye, ear, and body protection.
Read American National Standard Z49.1, "Safety in Welding, Cutting, and Allied Processes," From American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126; OSHA Safety and Health Standards, 29 CFR 1910, from U.S. Gov. Printing Office, P. O. Box 371954, Pittsburgh, PA 15250-7954.
AVERTISSEMENT
UN CHOC ELECTRIQUE peut etre mortel.
• Insallation et raccordement de cette machine doivent etre conformes a tous les pertinents.
SOUDAGE A L'ARC peut etre hasardeux.
• Lire le manuel d'instructions avant utilisation.
• Ne pas installer sur une surface combustible.
• Les fils de soudage et pieces conductrices peuvent etre a la tension de soudage.
1 1.1 1.2 1.3 4 4.1
2 2.1 2.2 2.3 5
3 3.1 3.2 3.3 6
206 627-B



2-2. Symbols And Definitions

A Amperes	V Voltage Input	S Suitable For Areas Of Increased Shock Hazard	Shielded Metal Arc Welding (SMAW)
V Volts	Increase/Decrease Of Quantity	Single Phase Static Frequency Converter-Transformer-Rectifier	
Output	Negative	Positive	Hz Hertz
Gas Input	High Temperature	Direct Current	Line Connection
% Percent	X Duty Cycle	U_1 Primary Voltage	U_2 Conventional Load Voltage
Alternating Current	U_0 Rated No Load Voltage (Average)	I_{1max} Rated Maximum Supply Current	I_2 Rated Welding Current
I_{1eff} Maximum Effective Supply Current	Remote	Lift-Arc Start (GTAW)	Gas Tungsten Arc Welding (GTAW)
Process	TIG (GTAW) Pulse	HF Impulse Starting (GTAW)	On
Off	Look under unit for label		

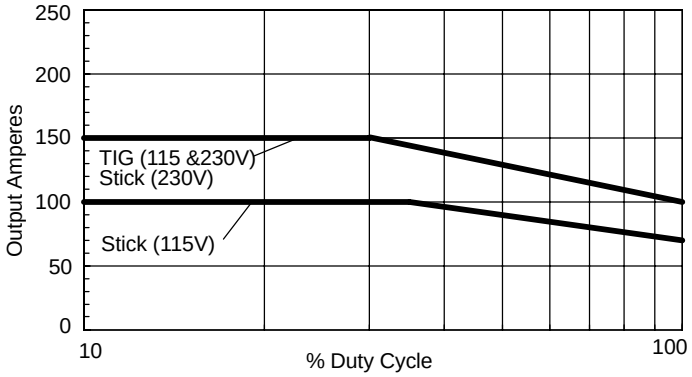
SECTION 3 − SPECIFICATIONS AND INSTALLATION

3-1. Specifications

Input Power Single-Phase AC	Rated Welding Output	Welding Amperage Range	Max OCV DC	Amperes Input At Rated Load Output, 50/60Hz, Single-Phase	KVA @ Duty Cycle	KW	Dimensions	Weight
115 Volts Stick	70A @ 22.8 Volts DC, 100% Duty Cycle	20 − 100A	90V *12-16	17.4	2.0	1.9	H: 9 in (229 mm) W: 5.5 in (140 mm) L: 13.25 in (337 mm)	13.7 lb (6.2 kg)
	100A @ 24.0 Volts DC, 35% Duty Cycle			26.4	3.0	3.0		
115 Volts TIG	100A @ 14.0 Volts DC, 100% Duty Cycle	5 − 150A	90V *12-16	18.4	2.1	2.1		
	150A @ 16.0 Volts DC, 30% Duty Cycle			28.0	3.4	3.1		
230 Volts Stick	100A @ 24 Volts DC, 100% Duty Cycle	20 − 150A	90V *12-16	13.1	3.0	2.8		
	150A @ 26.0 Volts DC, 30% Duty Cycle			21.6	4.9	4.7		
230 Volts TIG	100A @ 14.0 Volts DC, 100% Duty Cycle	5 − 150A	90V *12-16	8.3	2.0	1.9		
	150A @ 16.0 Volts DC, 30% Duty Cycle			14.2	3.2	3.1		

*Sense Voltage For Stick And TIG Lift Arc™

3-2. Duty Cycle And Overheating



Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

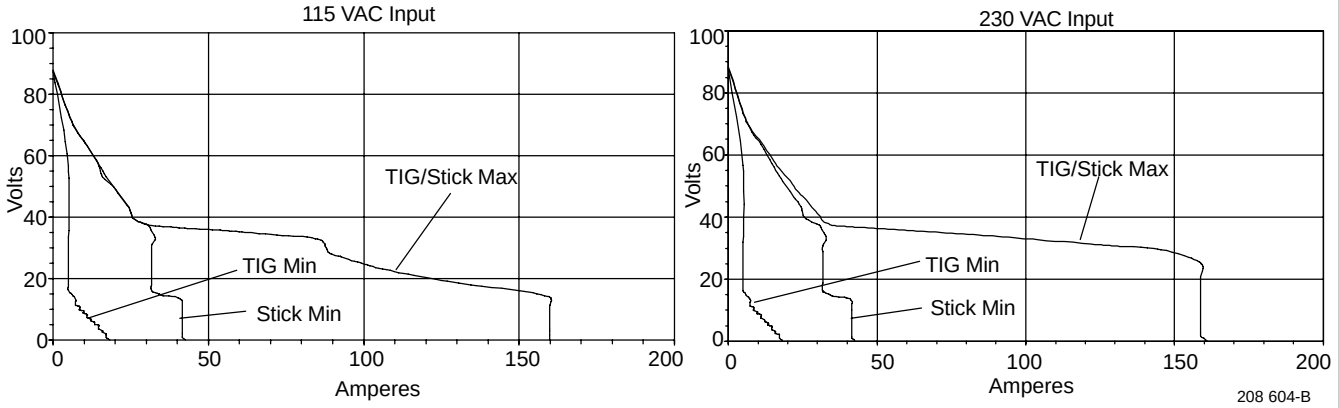
If unit overheats, output stops, the Overtemperature Light comes On, and the cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before starting to weld again.

▲ **Exceeding duty cycle can damage unit and void warranty.**

208 608-C

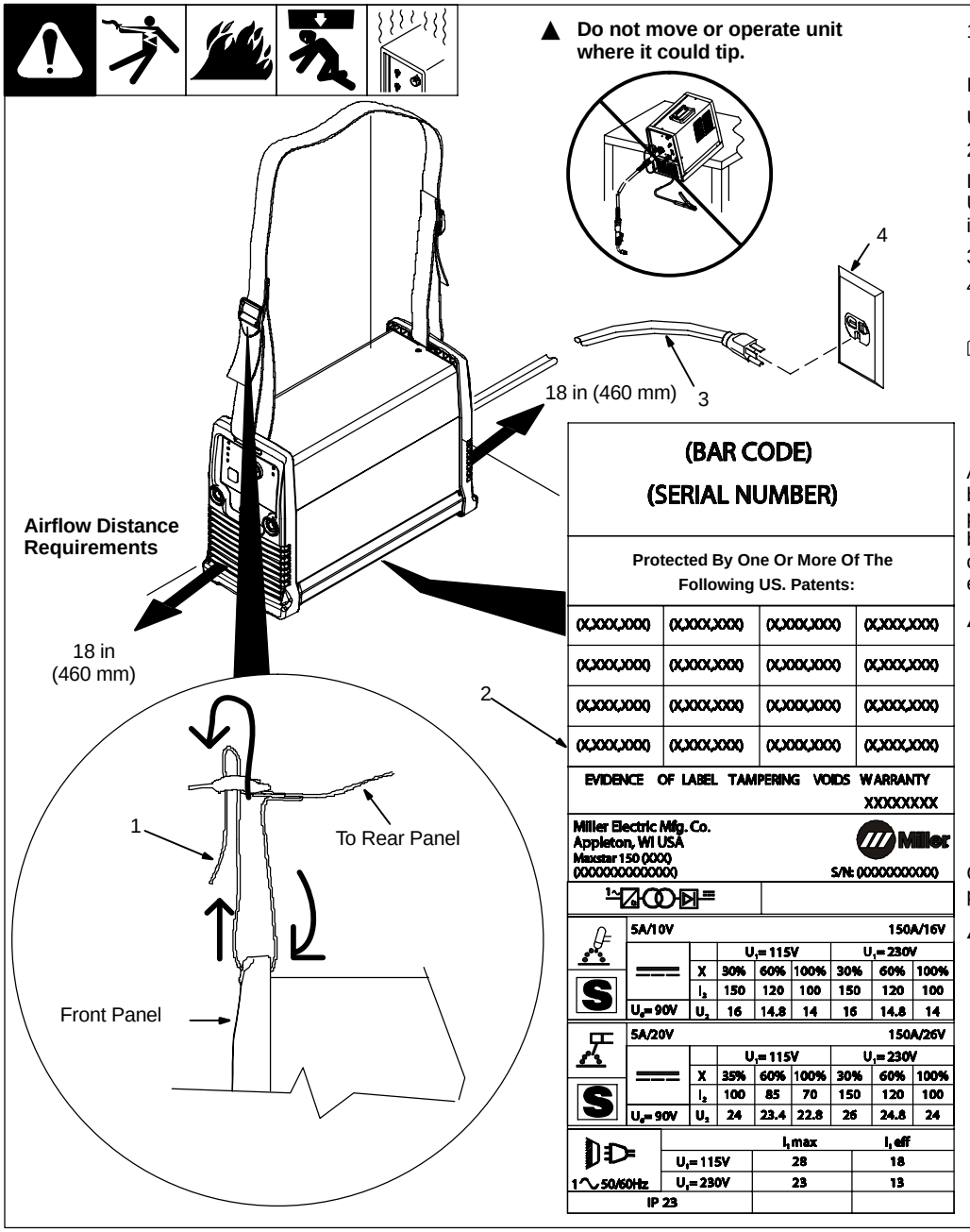
3-3. Volt-Ampere Curves

Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of welding power source. Curves of other settings fall between curves shown.



208 604-B

3-4. Installing Shoulder Strap, Selecting A Location, And Connecting Input Power



1 Welding Power Source Shoulder Strap

Install strap as shown.

Use strap to lift unit.

2 Rating Label

Label is located on bottom of unit. Use rating label to determine input power needs.

3 Input Power Cord

4 115 or 230 VAC Grounded Receptacle

☞ *The Auto-Line circuitry in this unit automatically links the power source to the primary voltage being applied, either 115 or 230 VAC.*

An individual branch circuit capable of carrying 30 amperes and protected by fuses or circuit breaker is recommended. Recommended fuse or circuit breaker size is 30 amperes.

▲ **Unit is supplied with a 115 VAC plug (CE models are not supplied with a line cord plug). For 230 VAC operation, have a qualified person obtain a proper plug that meets all applicable codes, and install the plug according to the manufacturer's instructions.**

Connect input power plug to a proper receptacle.

▲ **Special installation may be required where gasoline or volatile liquids are present − see NEC Article 511 or CEC Section 20.**

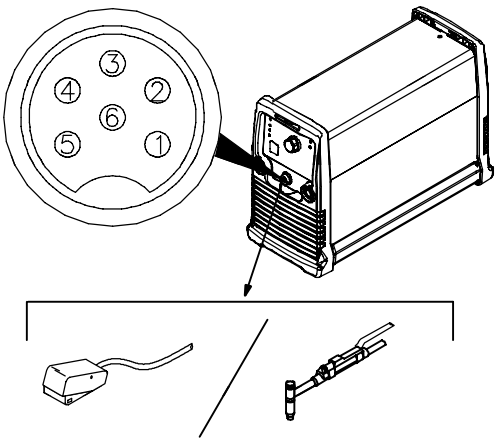
Ref. 803 351-C / 208 651-D

3-5. Selecting Extension Cord (Use Shortest Cord Possible)

Single Phase AC Input Voltage	Conductor Size − AWG [mm²]*				
	4 [21.2]	6 [13.3]	8 [8.4]	10 [5.3]	12 [3.3]
	Maximum Allowable Cord Length in ft (m)				
115	160 (49)	107 (33)	71 (22)	47 (14)	29 (9)
230	471 (144)	321 (98)	215 (66)	146 (45)	90 (27)

*Conductor size is based on maximum 3% voltage drop

3-6. Remote 6 Receptacle Information

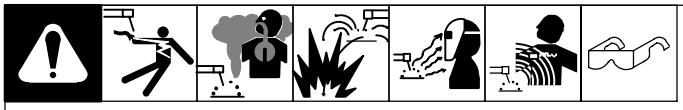


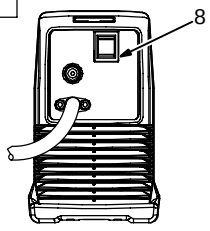
Ref. 803 351-C

REMOTE 6	Socket	Socket Information
15 VOLTS DC **OUTPUT CONTACTOR**	1	Contactor control +13.8 volts DC.
	2	Contact closure to 1 completes contactor control circuit and enables output when Lift-Arc TIG remote is selected.
REMOTE OUTPUT CONTROL	3	Output to remote control; +10 volts DC output to remote control.
	4	0 to +10 volts DC input command signal from remote control.
	5	Remote control circuit common.
CHASSIS	6	Chassis common.

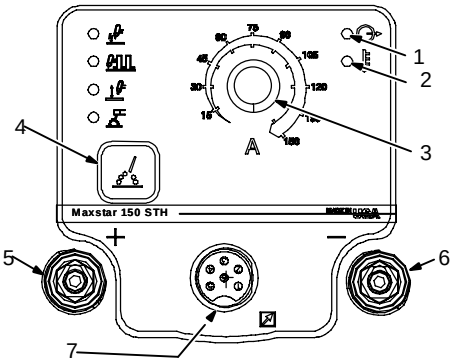
SECTION 4 − OPERATION

4-1. Front Panel Controls





Ref. 803 375 / 208 547-A



1 Ready Light (LED)

Light comes on approximately two seconds after power switch is placed in On (I) position if Lift-Arc On or Stick has been selected. If TIG Impulse is selected, ready light comes on only after output is enabled. The light indicates that the unit is energized and ready for welding. A flashing light indicates unit is not ready, or that there is a functional error.

☞ *The fan motor is thermostatically controlled.*

2 High Temperature Light (LED)

Light comes on if unit overheats. Once unit has cooled down, welding can resume. If this light flashes, take unit to an Authorized Service Agent.

3 Amperage Adjustment Control

This control adjusts welding amperage.

4 Process Select Switch

See Section 4-2.

5 Positive Weld Output Receptacle

For Stick welding, connect electrode cable to this receptacle. For TIG welding, connect work cable to this receptacle.

6 Negative Weld Output Receptacle

For Stick welding, connect work cable to this receptacle. For TIG welding, connect torch cable to this receptacle.

7 Remote Receptacle

For TIG Impulse or Lift-Arc TIG, output may be adjusted from min to max of the front panel setting with a remote control.

8 Power Switch

Place switch in On (I) or Off (0) position as needed.

4-2. Process Selection

1 Process Selector Switch Pad

Use control to select required welding process. Press switch pad until light (LED) for desired process is illuminated.

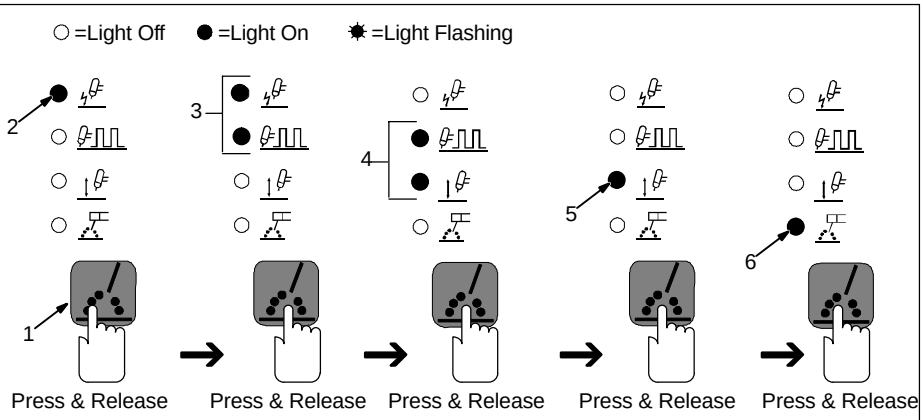
2 TIG Impulse Start

When selected, an impulse HF arc starting method is activated (see Section 4-3).

3 TIG Pulse With TIG Impulse Start

When selected, the TIG pulse welding process with impulse HF start is activated.

Pulsing is the alternating raising and lowering of the weld output at a specific rate. To change pulse frequency, see Section 4-4.



4 TIG Pulse With Lift-Arc™ Start

When selected, the TIG pulse welding process with Lift-Arc start is activated (see Section 4-3).

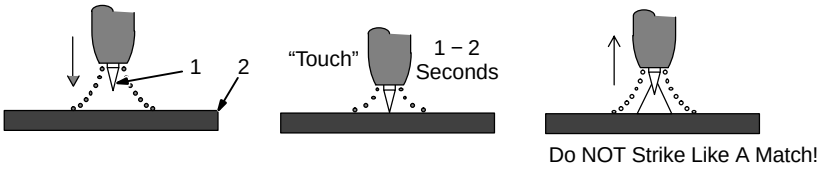
5 Lift-Arc Start

When selected, a TIG arc starting method in which the electrode must come in contact with the workpiece to initiate an arc is activated (see Section 4-3).

6 Stick (SMAW)

When selected, Adaptive Hot Start and DIG circuitry are energized.

4-3. Lift-Arc And TIG Impulse Start Procedures



☞ *Pictorials show Lift-Arc start method – do not use this method for TIG Impulse starts.*

Lift-Arc Start

1 TIG Electrode

2 Workpiece

Touch tungsten electrode to workpiece, **hold for 1-2 seconds**, slowly lift electrode, and an arc forms.

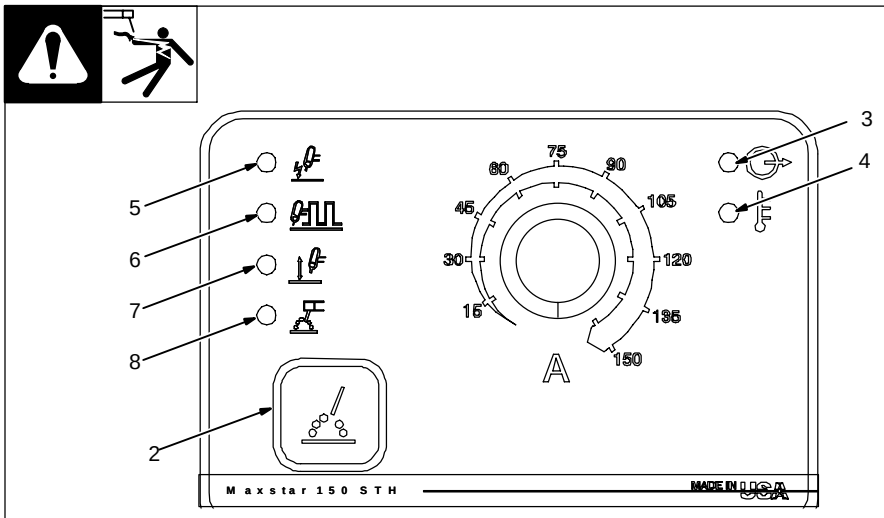
Open-circuit voltage maybe present before electrode touches workpiece.

TIG Impulse

High frequency starts arc when output is enabled without making contact with the workpiece. High frequency turns off when arc is started.

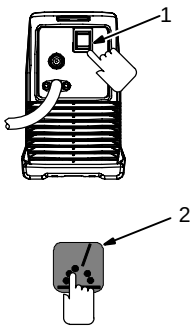
Notes

4-4. Set-Up Procedure For The TIG Process And Restoring Factory Default Settings



Set-Up Procedure

1 Power Switch
2 Process Switch Pad
3 Ready Light
4 High Temp Light
5 TIG HF Light
6 TIG Pulse Light
7 TIG Lift-Arc Light
8 Stick Light



To enter Set-Up Mode, turn power On while pressing and holding the Process switch pad for approximately 5 seconds, until the Ready (3) and High Temp (4) lights flash alternately.

Selectable Features:

Feature 1 − Selectable Trigger Method (3 to choose from):

1 - **Standard trigger** − Typically used with a remote amperage control device. Standard trigger provides non-contact start in DC Impulse TIG mode. It also enables Lift-Arc start, with a remote control, in Lift- Arc mode.

2 - **Lift-Arc Panel Control** − Allows Lift-Arc start without using a remote control device. Lift-Arc is used when HF starts are not permitted, or to replace scratch starts.

3 - **2T Trigger Hold** − In the HF mode, used with a push button control device as an on-off switch. In the Lift-Arc mode, using the Lift-Arc method (see Section 4-3), push and release torch trigger to start weld. Push and release torch trigger to end weld current and start Auto Crater. Auto Crater ramps weld current down at a fixed rate to end the weld cycle.

To change trigger method, enter set-up mode as described above and illustrated on the next page.

Feature 2 − Pulse Frequency: Choose from the following four intervals: .5 PPS, 1 PPS, 2.5 PPS, or 60 PPS.

To change pulse frequency, enter set-up mode as described above and illustrated on the next page.

Restoring Factory Default Settings

To restore factory default settings, press and hold process switch pad and turn power On. Ready and high temp lights will begin to flash alternately. Continue holding process switch pad for approximately 10 seconds until the lights begin to flash simultaneously. Release switch pad, as factory default settings are restored. The lights will continue to flash until unit is turned Off. To return to normal welding operation, turn power On.

Factory default settings:

Trigger Methods for Models with Stock No. 907 136-014 only:
TIG Impulse-standard; Lift-Arc-standard

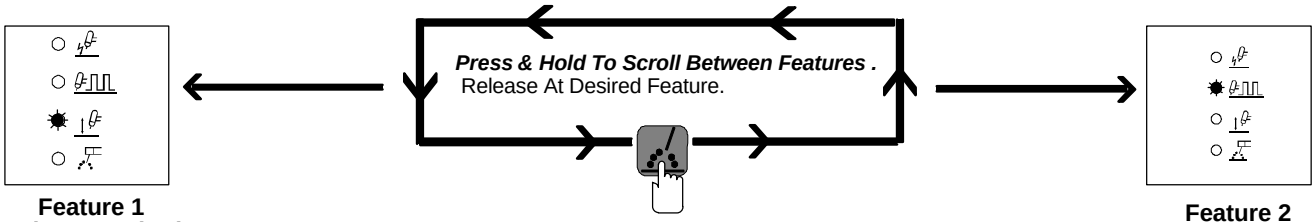
Trigger Methods: TIG Impulse-Standard; Lift-Arc−On

Pulse Frequency - 2.5 PPS

Lights Indicate Which Selection Is Active

✹ Light Flashing = Active Feature

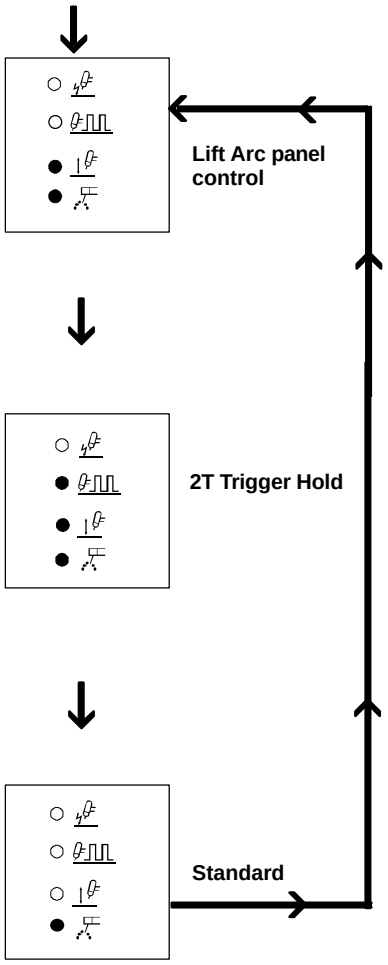
● Light On = Selected Option Of Feature 1 Or 2



Feature 1
Trigger Method

Press and release switch pad to see active Trigger Method. Continue to **press and release** switch pad to change Trigger Method.

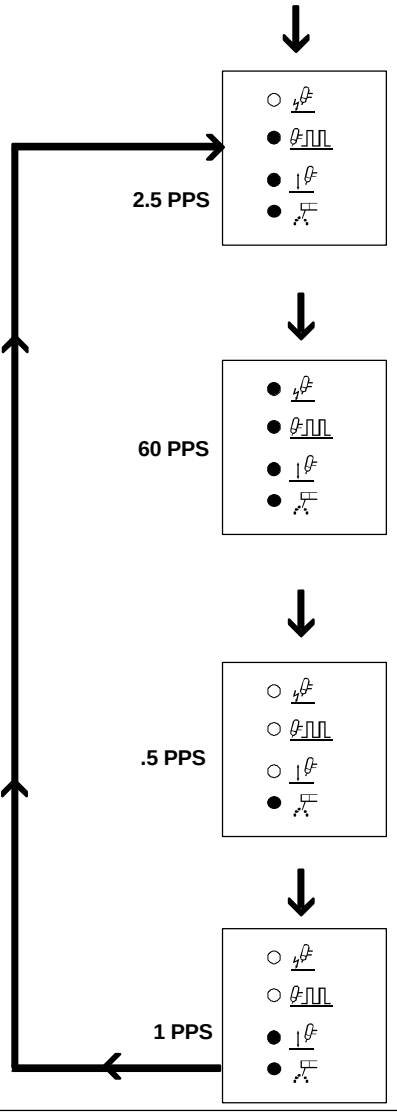
NOTE: If no action is taken within 5 seconds, the light for Feature 1 begins to flash, and last Trigger Method selected remains active.



Feature 2
Pulse Frequency (PPS)

Press and release switch pad to see active Pulse Frequency. Continue to **press and release** switch pad to change Pulse Frequency.

NOTE: If no action is taken within 5 seconds, the light for Feature 2 begins to flash, and last Pulse Frequency selected remains active.



To save changes and exit set-up mode, press and release torch trigger, or turn power off and wait until lights turn off, and then turn power back on.

SECTION 5 − MAINTENANCE AND TROUBLESHOOTING

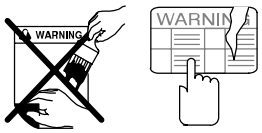
5-1. Routine Maintenance

▲ **Disconnect power before maintaining.**

☞ *Maintain more often during severe conditions.*

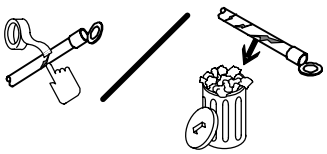
3 Months

Replace unreadable labels.



Replace Damaged Gas Hoses

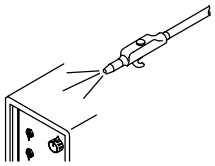
Repair Or Replace Cracked Cables And Cords



6 Months

▲ **Do not remove case when blowing out inside of unit .**

Blow out inside. Direct airflow through front and back louvers.



5-2. Troubleshooting

Trouble	Remedy
No weld output; unit completely inoperative; ready light (LED) Off.	Place line disconnect switch in On position.
	Check and replace line fuse(s), if necessary, or reset circuit breaker.
	Be sure power cord is plugged in and that receptacle is receiving input power.
No weld output; ready light (LED) On.	Check and secure loose weld cable(s) into receptacle(s).
	Check and correct poor connection of work clamp to workpiece.
No weld output; high temperature light (LED) On.	Unit overheated causing thermal shutdown. Allow unit to cool with fan On (see Section 3-2).
	Reduce duty cycle or amperage.
	Check and correct blocked/poor airflow to unit (see Section 3-4).
No weld output; high temperature light (LED) Flashing.	Turn Power Off and back On again. If light continues to flash, check with Factory Authorized Service Agent.
No weld output. Blue light (LED) flashes continuously, yellow light (LED) off.	Line voltage too high or too low. Line voltage must be within ±10%.
	Unit needs to rest. Cycle power off and back on. If problem is not corrected, contact Factory Authorized Service Agent.
No weld output. Blue light (LED) flashes 3 times repeatedly, yellow light (LED) off.	Remote trigger left on. Turn off remote trigger, wait 5 seconds, and restart operation.
Erratic or improper welding arc or output.	Use proper size and type of weld cable (see your Distributor).
	Clean and tighten weld connections.
	Check and reverse polarity; check and correct poor connections to workpiece.
Fan not operating.	Unit not warmed up enough to require fan cooling.
	Check for and remove anything blocking fan movement.
	Have Factory Authorized Service Agent check fan motor and control circuitry.
Stick welding problems: Hard starts; poor welding characteristics; unusual spattering.	Use proper type and size of electrode.
	Check and reverse electrode polarity; check and correct poor connections.
	Make sure a remote control is not connected.
TIG welding problems: Wandering arc; hard starts; poor welding characteristics; spattering problems.	Use proper type and size of tungsten.
	Use properly prepared tungsten.
	Check and reverse electrode polarity.
TIG welding problems: Tungsten electrode oxidizing and not remaining bright after welding.	Shield weld zone from drafts.
	Check for correct type shielding gas.
	Check and tighten gas fittings.
	Check and change electrode polarity.

SECTION 6 − ELECTRICAL DIAGRAM

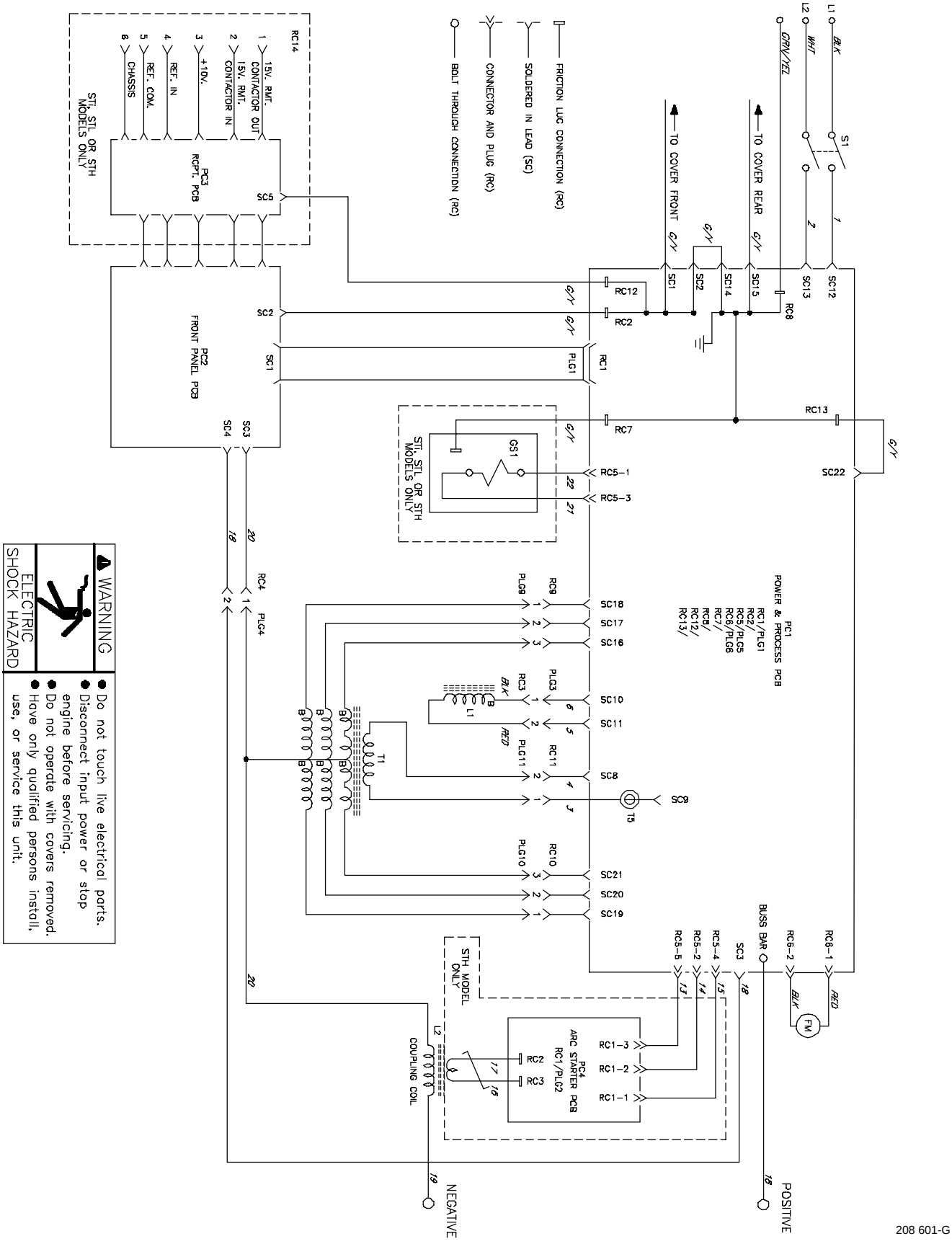


Figure 6-1. Circuit Diagram For Non CE Model Welding Power Source

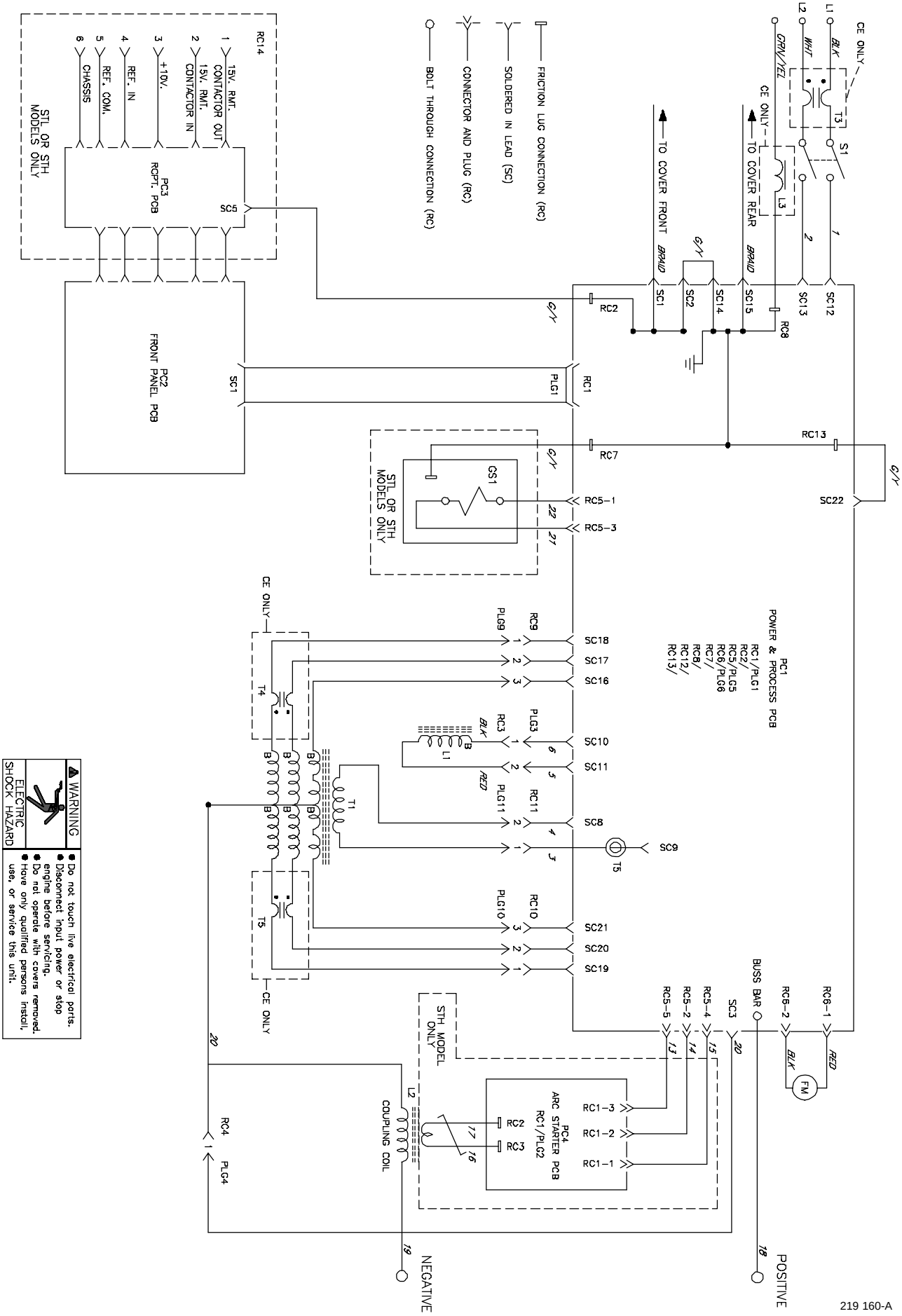
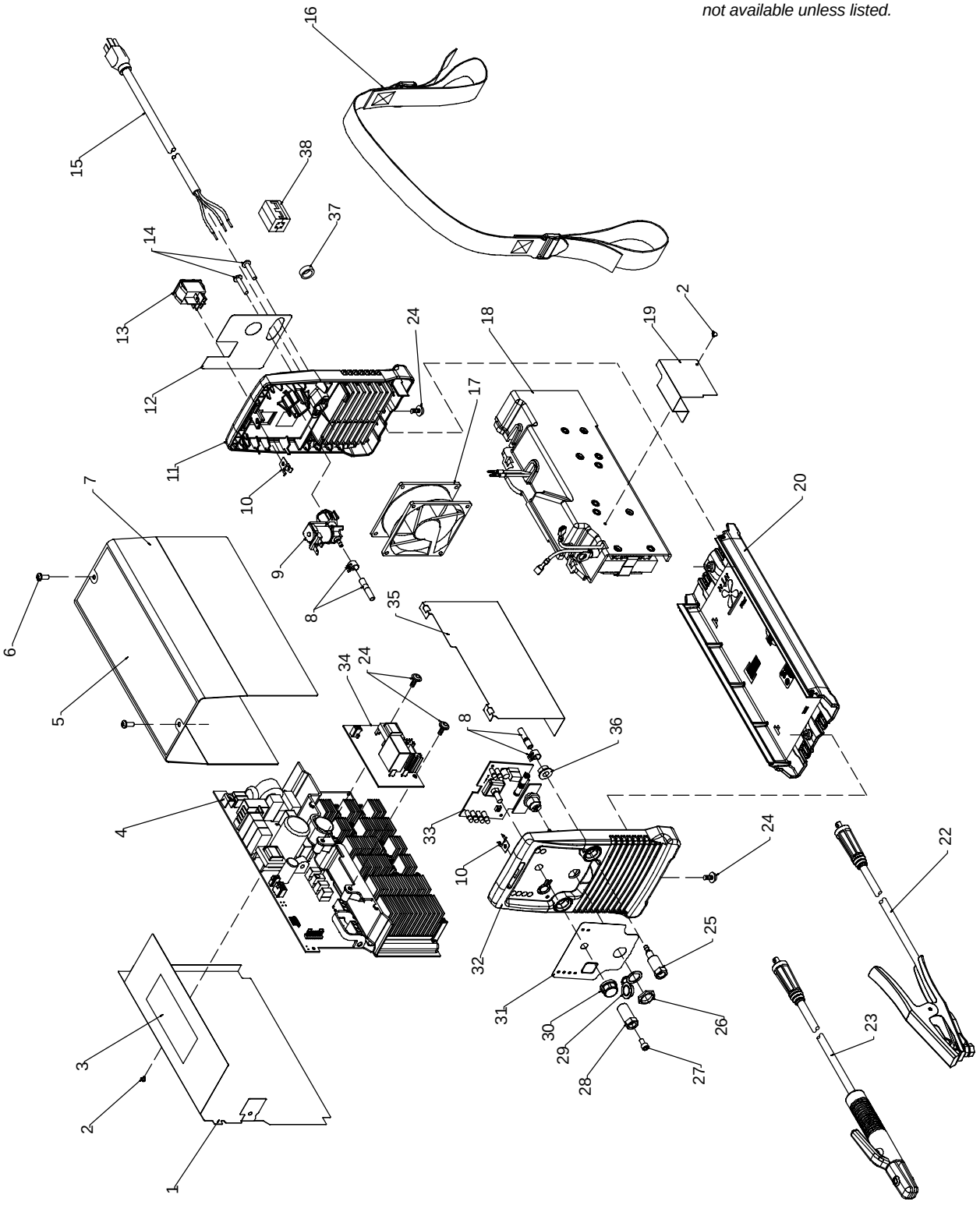


Figure 6-2. Circuit Diagram For CE Model Welding Power Source

Notes

SECTION 7 − PARTS LIST

☞ *Hardware is common and not available unless listed.*



803 447-F

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
1		208 701	Insulator w/label	1
2		146 549	Fastener, push-in	2
3		208 622	Label, warning	1
4	PC1	212 886	Windtunnel, heatsink w/components	1
4	PC1	216 351	Windtunnel, heatsink w/components (CE models)	1
5		208 627	Label, warning	1
5		219 674	Label, warning (CE models)	1
6		195 666	Screw, 010-32x .50 torx	2
7		208 700	Wrapper w/label	1
7		219 979	Wrapper w/label (CE models)	1
8		208 569	Hose and clamps (2)	1
9	GS1	219 967	Valve, gas w/fittings	1
9	GS1	219 966	Valve, gas w/fittings (CE models)	1
10		208 558	Term, friction .250 x .032	2
11		208 703	Panel, rear w/label	1
11		219 982	Panel, rear w/label (CE models)	1
12		208 549	Nameplate, rear	1
12		219 880	Nameplate, rear (CE models)	1
13		208 550	Switch, rocker dpst 16A 250 VAC	1
14		208 536	Screw, K50 x 25 rnd washer, hd-trx	2
15		208 687	Cable, power	1
15		219 167	Cable, power (CE models)	1
16		208 548	Strap, shoulder	1
17	FM	208 496	Fan w/leads and plug	1
18	L1, L2, T1	208 702	Windtunnel, magnetics w/cmpnt	1
18	L1, L2, T1	219 169	Windtunnel, magnetics w/cmpnt (CE models)	1
19		208 552	Insulator, negative stud	1
20			Base w/label, order by serial number	1
22		208 561	Work Cable	1
23		208 596	Holder, electrode	1
24		208 535	Screw, k50 x 12 rnd washer hd-trx	4
25		208 612	Receptacle, twist lock power/gas	1
26		208 588	Nut, plastic 625-27.81 hex x .14	1
27		208 591	Screw, m5-.8 x 12 soc hd -torx	1
28		208 498	Receptacle, twist lock power	1
29		208 589	Cover, dust	1
30		174 992	Knob, pointer	1
31		208 575	Nameplate, front	1
31		208 547	Nameplate, front (CE models)	1
32		208 573	Panel, front w/nameplate	1
32		219 172	Panel, front w/nameplate (CE models)	1
33	PC2, PC3	212 895	Circuit board, operator interface	1
33	PC2, PC3	218 773	Circuit board, operator interface (CE models)	1
33	PC2, PC3	221 717	Circuit board, operator interface (Japanese models)	1
34	PC4	212 890	Circuit board, arc starter	1
35		208 556	Insualtor, heat sink	1
36		208 497	Nut, m08-1.2 13 mm hex 8.3 mm t semi cone washer	1
37	L3	219 078	Core, toroidal (CE models)	1
38	T3	219 076	Core ferrite (CE models)	1

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

Notes

Notes

ENGLISH

TRUE BLUE® WARRANTY

Effective January 1, 2005
(Equipment with a serial number preface of “LF” or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

Warranty Questions?

Call
1-800-4-A-MILLER
for your local
Miller distributor.

Your distributor also gives you ...

Service
You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

Support
Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

LIMITED WARRANTY − Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Sources (Unless Otherwise Stated)
   * Water Coolant Systems (Integrated)
   * Intellitig
   * Maxstar 150
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor Unless Specified
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources and Coolers
   * Water Coolant Systems (Non-Integrated)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * HF Units
   * Grids
   * Maxstar 85, 140
   * Spot Welders
   * Load Banks
   * Arc Stud Power Sources & Arc Stud Guns
   * Racks
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT & SAF Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

Miller’s True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer’s warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller’s option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer’s risk and expense. Miller’s option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

Owner's Record

Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip

For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables Options and Accessories Personal Safety Equipment Service and Repair Replacement Parts Training (Schools, Videos, Books) Technical Manuals (Servicing Information and Parts) Circuit Diagrams Welding Process Handbooks To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller
Contact the Delivering Carrier to:	File a claim for loss or damage during shipment. For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

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